

12/31/08

Re: 0821-6-Study Report-5-Green Architecture Manifest

Our goal for the Wellesley Senior Center is to produce a design that is as close to LEED certifiable as our budget will permit. One sustainable design approach is to reduce the waste that is created by new construction, not only waste of building materials, but also the waste in energy, land, air and water needed to produce the building. There are five main categories for achieving LEED certified sustainable design: **sustainable site, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.**

SUSTAINABLE SITE

Our approach to land use is LEED's most highly recommended approach for sustainable design. This is to respect and reuse land that had already been used before and to restore a contaminated "brown field" to a usable site. This approach conserves land, which allows for open space to remain elsewhere in town. The site we chose also allows us to reuse site improvements that had already been constructed in prior infrastructure of the town, such as roads and utilities. We encourage the town to make use of shared parking lots thereby reducing the amount of paved areas. For example, the church next door may use the senior center parking lot on evenings and weekends because senior center activities are limited at these times.

Our landscape design approach is to restore open space on a site that had previously been developed with buildings and paving. The landscape designer will use vegetation that is natural to the region, rather than introducing exotic plantings or overly manicured lawns that would require artificial fertilizers, expensive maintenance with gas powered mowers, and excessive watering.

A sustainable approach to watering the landscaping can be to capture roof and parking water runoff into underground cisterns and reuse that water for landscape irrigation systems.

The ground cover will be selected to control erosion and sedimentation. Finally, the parking lot will contain several landscape areas to reduce heat islands. The parking lot lighting will be designed to the one foot-candle minimum code and life safety requirements with low profile lighting to minimize light pollution in the residential area. The installation of walkway fixtures with energy efficient reflection systems will allow us to minimize the total quantity of fixtures and energy used to light the parking lot.

Alternative transportation will be encouraged through the introduction of a van shuttle service to and from the Senior Center. In addition, a barrier free wheel chair accessible trail is suggested on the adjacent recreation land across the street.

WATER EFFICIENCY

The basic strategies for sustainable design of water usage start with a healthy respect for the way water on the site interacts with the local ecology. Since the street storm water system is at its capacity, it is important to minimize runoff to storm drainage systems and to protect the runoff from pollution. Gas and oil traps shall be provided to filter off parking lot storm drainage and recharge the aquifer. It is important to set goals for conserving water and for preserving or restoring water quality.

The water that the site receives includes rainwater, town water and ground water. The town may collect the rainwater from roof drains for landscape watering use in order to conserve fresh potable water in the town water system. The designers can reuse rainwater by collecting roof run-off into an underground cistern and pumping the water back into the landscape irrigation systems as needed. However, the rain converting system is very expensive. Alternatively, the landscape designer will specify drought resistant plantings in the landscape design to eliminate the need for any irrigation at all.

The designers will make every effort to reduce the water usage by specifying water-efficient plumbing, such as slow flow toilets and faucets and automatic shut-off faucet hardware.

Finally, it is important to remind the building maintenance staff that the building will be operated under conservation guidelines, which include a checklist of items to monitor as an ongoing effort. The director should encourage the users of the building to conserve water in the building and at home.

ENERGY & ATMOSPHERE

For this project, our energy approach is to show respect for the limited energy we have by incorporating energy savings into our mission statement for the design. If grants are available, we will evaluate the long-term economic benefit of Geo-Thermal heating and cooling of the building. We will maximize the natural energy we receive using passive solar light and heat wherever possible. We also will evaluate the finish materials with respect to their embodied energy required to produce them and will specify a minimal usage of those products that require large amounts of energy to produce.

We will reduce the operating energy requirements of the building by specifying Low-e argon filled insulating glass windows with fiberglass frames. We will design windows and light room finishes that maximize daylight effectiveness inside the rooms. We will specify higher R-value insulation in the walls than minimum code requirements. We will specify photo sensors and stepped lighting controls for lighting during the day. A motion detector tied to light switches will reduce the lighting energy usage by 20%.

We will reduce the operating mechanical energy by specifying operable windows allowing for natural ventilation during temperate seasons of the year. We will tie outside air intake to a static pressure sensor that responds to natural ventilation. We will design an energy management system that shuts off unoccupied zones. We will specify high efficiency fans and motors. We will reduce the embodied energy of materials selected by specifying local finishes wherever possible, and specifying renewable sources such as wood framing, doors and windows. We will specify soy based form insulation, and carpet and drywall panels that contain at least some recycled materials. We expect the resulting gas usage in BTU/SF/YR will be under 30,000 which will result in a cost of \$.33/SF/YR. The resulting electrical energy may be as low as 5.92 KWH/SF/YR which may amount to an actual cost of \$.63/SF/YR. This is to be compared with a typical electrical cost of \$1.25/SF/YR in non-green buildings.

We intend to publicize our approach at Town Meetings and suggest that the Wellesley Senior Center produce a display in the building that informs the public about the conservation methods employed in the design and operation of the building.

MATERIALS & RESOURCES

Given the fact that buildings consume 40% of the annual depletion of the world's raw stone, gravel, steel, iron and aluminum, it is clear that buildings contribute significantly to the consumption of the world's entire supply of raw materials. Therefore, we must begin to reduce the amount of raw materials we use in new construction or we will witness the complete depletion of some raw materials in our lifetime. For this reason, we intend to minimize the use of non-recyclable carpeting. The small amount of carpet we will specify is part of a closed loop recycling program which contains 50% recycled nylon. This carpet will be 100% recyclable when it is eventually removed. We also will choose materials that easily biodegrade once they are discarded.

Secondly, we also will choose materials that generate less negative impacts on the world supply of materials. We will specify other products that contain recycled material and/or materials that are easily replaced through farming or reforestation. For example, we will specify tile flooring that contains 75% recycled glass. We will specify linoleum flooring in the main entrance hall because it is a renewable resource. In addition, we will design the structure with wood framing rather than steel studs because wood framing is a renewable resource through re-forestation.

Third, we will select and design in a way that allows us to recycle in the future more materials from our current designs. The Green Label Certified carpeting mentioned above is one example. Wood framing was also preferred over steel stud because wood is more easily modified and reused.

One sustainable strategy is to reduce the total amount of building area needed through efficient use of the space. The main hall and the large meeting room are both designed to be open and flexible for multiple uses as two separate rooms, or as large meeting halls by means of movable partitions. Other rooms are also designed to function for multiple uses at different times of the day.

Another strategy is to detail construction to eliminate extraneous materials and to minimize waste. We will design materials in stock sizes wherever possible, such as designing walls to be built of 8' studs that do not need to be cut.

We will choose materials that cause fewer environmental problems. For example, we are encouraged by the Fire Departments to eliminate or reduce toxic materials such as polyvinyl chloride piping and vinyl tile flooring which can produce deadly toxic fumes in a fire. Linoleum flooring is suggested in place of vinyl tile flooring. We also will use durable materials such as cementitious clapboard in place of wood siding to minimize the need for future replacement. In addition, we will choose local suppliers of granite, concrete block, maple, and brick pavers.

We plan for the location and storage capacity for pick up and disposal of recycled materials. Also we will design a flexible building that may be modified in the future for different room layouts and/or uses. Unfinished basement spaces will be designed to accommodate storage needs and future activity rooms. Building walls of easily removed wood frame construction and minimizing the use of bearing walls also will allow for future modifications with minimum of waste.

Finally, we will communicate to the owner, building materials maintenance instructions for the future building managers and maintenance superintendents to observe.

INDOOR ENVIRONMENTAL QUALITY

One approach is to respect the prevailing wind conditions at the site and incorporate the findings into the site planning of the building fresh air intake manifolds to receive the cleanest quality of air. Conversely, these intake registers will be located as far from noxious fumes of cars, trash bins, etc. as possible.

We will improve indoor air quality by incorporating natural planting in the sun lit area at the front entrance. In that way we will introduce pleasing scents and plentiful air changes, a minimum of 20 CFM to enhance indoor air.

We will reduce wasted ventilation by limiting the use of kitchen hood exhaust. This will be done by power switching with a timer. We also will reduce the sources of air contamination such a VOC's, radon, dust, mold, mites and pollen through the use of electrostatic air filters.

We will reuse lost air through a heat recovery system and will use borrowed make-up air from adjacent spaces that are relatively clean rooms.

CONCLUSION

In conclusion, the building will implement many LEED sustainable guidelines while meeting budget constraints and satisfying functional and aesthetic objectives. We hope this building will become a model of senior centers for other towns to study.